AUGUST 1961

THE AIR LINE PILOT

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THE AIR LINE PILOT

AUGUST 961

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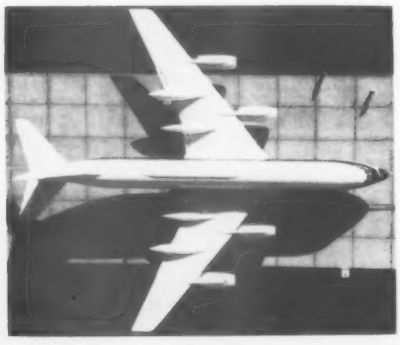


Convair Photo

The new Convair 990 jet airliner will be issued a provisional FAA certification in October, 1961. Deliveries of the aircraft to American Airlines, Swissair, SAS, and Real are scheduled for October and November. A commercial airworthiness certificate will be obtained in December, 1961, according to Convair.

By WILLIAM J. MacWILLIAMS
Director of Research, Air Line Pilots Association

THE ECONOMICS OF TWO RETIREMENT PLANS

Retirement plans are of two types — fixed and variable benefits. The economic advantages and disadvantages of each are discussed.

AT the Thirteenth Biennial Meeting of the Association's Board of Directors in 1954, policy was adopted which authorized the negotiations of pilot retirement programs. The basic goal was, and is, the achievement of a "realistic income at a realistic age."

Since the 1954 Meeting, negotiations have been conducted with over thirty airlines, resulting in retirement programs which will insure the retired pilot, after the completion of his airline career, an income equivalent to the average of his career earnings. Stated another way, the retirement benefits will approximate fifty per cent of the pilot's earnings for his final year of employment provided he has participated in the Plan for thirty years and retires immediately following his sixtieth birthday. Under these assumptions, the concept a "realistic income at a realistic age" has been achieved.

Two Basic Plans

Every pilot should be aware that his retirement benefits will be provided from two basic plans. The Fixed Benefit Plan assures a retirement income in fixed dollars, directly related to the formula of the Plan, and accrues each year as the formula is applied to the pilot's annual or monthly income. The benefit may be stated as a percentage of total pilot contribution; e.g., an annual benefit equal to three-eighths of the pilot's aggregate contribution, or as a formula applied to annual or monthly earnings; e.g., a benefit equal to three-fourths of one per cent of the first $3,000 of annual income plus one and one-half per cent of all annual income in excess of $3,000 for each year of future service.

The Variable Benefit Plan provides for a retirement income which is not fixed or guaranteed in advance, but is determined by the contributions of both the pilot and the carrier and the value of the contribution at and after retirement. The contributions of the Variable Benefit Plan are deposited in a trust fund for investment in equity securities by the trustee. Such investments are made with yield and the principle appreciation as the basic consideration.

The Fixed Benefit has no relationship to any changes in the cost of living which may occur during the pilot's career. The retirement income is a fixed amount of dollars. A dollar of retirement benefit earned at age thirty, but payable at age sixty may be diluted to a considerable extent in terms of purchasing power. Conversely, if the cost of living decreases, the benefits would increase in terms of purchasing power. This characteristic is true for any insurance annuity which may be purchased by an individual during his working career with the purpose of providing an income for life payable at some future date.

Variable Benefit

The Variable Benefit will increase or decrease as the market values of equity investments fluctuate. Basically, the stock market has followed the general change in the cost of living. Over a long period of time, the values of stocks follow the trend of the purchasing power of the dollar. As this purchasing power has continually declined in American economy, the value of equity securities has increased. In other words, the increase in the cost of living has been paralleled by an increase in market values. The yield of equity investments has historically been highest when stock prices are lower and conversely, has been lower when stock prices have been higher. The appreciation or depreciation of investments is directly related to the value of the investments at the time of the purchase. Measurements from a high market price to a high market price would indicate a relatively minor appreciation or depreciation over a period of time However, a measurement from a high market price to a low market price or from a low market price to a higher market price would indicate considerable depreciation or appreciation in the value of securities.

The preceding oversimplifies the Variable Benefit investments however. Such measurements of yield appreciation or depreciation will be diluted because of the procedures used in the purchase of the investments. By using the method of "dollar-cost-averaging," a relatively fixed number of dollars constantly invested over a long period of time will insure a wide diversion not only in the type of securities purchased, but also in the prices paid for the securities. "Dollar-cost-averaging" simply means that with a given number of dollars, a greater number of securities may be purchased when stock prices are low than when they are high. Over the years, the method will develop an investment portfolio, the value of which will be higher than the average purchase price of the securities included in the portfolio. Thus, the measurement of yield appreciation or depreciation will vary widely among the individual investments.

The preceding outline of the basic concept of retirement as negotiated by the Association is becoming more and more of interest to pilots who have already retired or will retire within the next few years. Currently, the retired pilot is not receiving the "realistic income" which was advocated at the 1954 Board of Directors' Meeting for the simple reason that such pilot did not have the necessary years of participation under the Plans. The Association has, however, negotiated minimum retirement benefits which have increased retirement income for pilots already retired or who will retire in the near future. Regardless of the amount of retirement benefits, the retired or near retired pilot will quickly realize that his income will vary periodically as the value of the Variable Annuity fluctuates reflecting changes in the stock market.

Units of Interest

Without attempting to explain the actuarial principles involved in arriving at the value of the Variable Annuity, it is sufficient to note that the *portion* of the retirement income attributable to the Variable Annuity is expressed in terms of "units of interest." The num-

(Continued on page 22)

By B. G. HUGHES, *Captain, TCA, Montreal*

The Royal Canadian Air Force 5BX Plan For Physical Fitness

BY NOW, most pilots are probably aware of the 5BX symbol and its relation to physical fitness. For those of you who have just tuned in, here is the story behind 5BX.

The idea to develop a self-measurable and simple daily exercise plan for physical fitness was conceived by Royal Canadian Air Force personnel in 1952. The necessary research and development of the plan was carried on by officers of the RCAF Recreation Branch during the period 1955-58, assisted by nine Canadian University professors of physical education, plus various members of the RCAF Supplement Reserve.

Why the need for such a plan? The answer is obvious. Mechanization, automation and work saving devices have combined to make life easier, depriving us of desirable physical activity. Many of us are in danger of deteriorating physically in spite of our constantly improving standard of living.

The developed plan is well and completely described in a booklet put out by the Queen's Printer, Ottawa. Copies of the complete 5BX may be obtained by money order for 35 cents each, less 25 per cent for orders of 100 or more. Money orders should be made out and addressed to the: Queen's Printer, Ottawa, Canada.

For those who may not get around to writing for the booklet, a condensed version, outlining the bare essentials and including the first two charts follows: However, I would urge all to get the book. Speaking as a recent "graduate" of the 5BX Plan, I can tell you this about it.

The course does live up to all the claims it makes. 5BX is tailor-made for air line pilots. It can be done anywhere, anytime and no equipment is required.

The course is not simple throughout. Like most other worthwhile goals in life it requires work. What is simple is getting started. Anyone under 60 can take this course with ease, and as long as you do the exercises as prescribed you will eventually reach your charted level. I would like to emphasize the fact that you should not set target dates for yourself, nor should you do these exercises on a competitive bases. To do so would completely defeat the purpose. Remember that even though we should all be able to reach our "level," we all possess a slightly different capacity to progress. Take your own time and never mind the others.

5BX is not going to make a "Charles Atlas" out of you, and I do not think any of us will wind up wearing a Big 10 uniform; but if you could see the file of *unsolicited* testimonials that have been received by the RCAF in its support (including Police Forces, Fire Fighters, Schools, and a recent endorsation by President Eisenhower's Council for Physical Fitness), then I think you would have to agree this thing is good! It is also interesting to note that the Queen's Printer in Ottawa is being swamped with requests for 5BX pamphlets, not only from points all over

(Continued on page 23)

PHYSICAL CAPACITY RATING SCALE CHART 1

Level	EXERCISE					½ mile run	1 mile walk
	1	2	3	4	5	In minutes	
A+	20	18	22	13	400	5½	17
A	18	17	20	12	375	5½	17
A−	16	15	18	11	335	5½	17
B+	14	13	16	9	320	6	18
B	12	12	14	8	305	6	18
B−	10	11	12	7	280	6	18
C+	8	9	10	6	260	6½	19
C	7	8	9	5	235	6½	19
C−	6	7	8	4	205	6½	19
D+	4	5	6	3	175	7	20
D	3	4	5	3	145	7½	21
D−	2	3	4	2	100	8	21
Minutes for each exercise	2	1	1	1	6		

PHYSICAL CAPACITY RATING SCALE CHART 2

Level	EXERCISE					1 mile run	2 mile walk
	1	2	3	4	5	In minutes	
A+	30	23	33	20	500	9	30
A	29	21	31	19	485	9	31
A−	28	20	29	18	470	9	32
B+	26	18	27	17	455	9½	33
B	24	17	25	16	445	9½	33
B−	22	16	23	15	440	9½	33
C+	20	15	21	14	425	10	34
C	19	14	19	13	410	10	34
C−	18	13	17	12	395	10	34
D+	16	12	15	11	380	10½	35
D	15	11	14	10	360	10½	35
D−	14	10	13	9	335	10½	35
Minutes for each exercise	2	1	1	1	6		

Captain Hughes' introduction appeared in the April, 1960 issue of The Canadian Air Line Pilot. Illustrations are by courtesy of Royal Canadian Air Force.

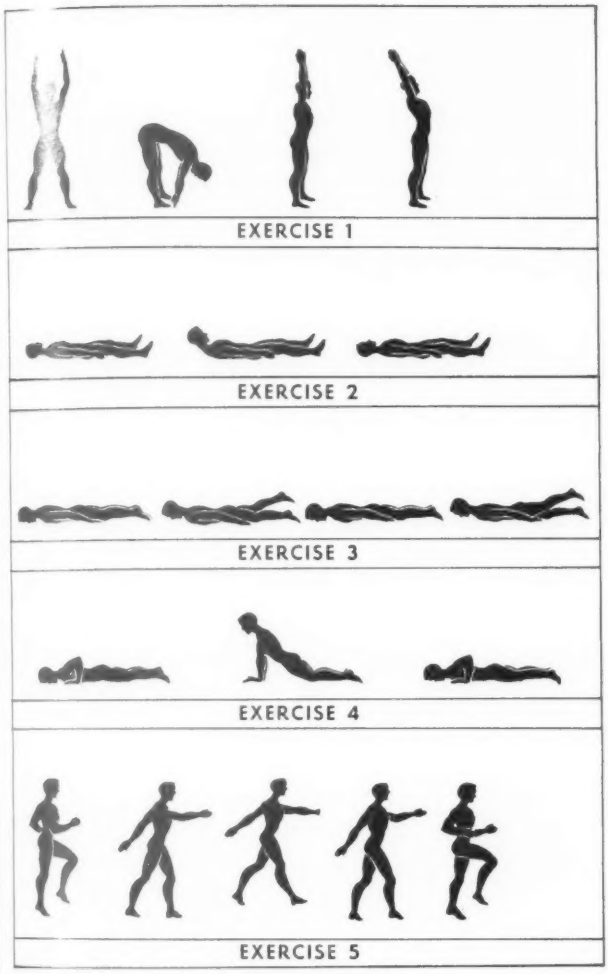


CHART 1

EXERCISE 1—Feet astride, arms up. Bent to touch floor then stretch up, backward. Keep knees straight. (Some persons never touch floor but benefits are equal in pushing down as far as possible.)

EXERCISE 2—Lie on back, feet six inches apart, arms at sides. Sit up far enough to see heels. Keep legs straight. Head and shoulders must clear floor.

EXERCISE 3—Lie face down, palms under thighs. Raise head, and one leg. Repeat using legs alternately. Keep leg straight at knees. Thighs must clear palms.

EXERCISE 4—Lie face down, hands under shoulders, palms flat on floor. Straighten arms, lifting upper body, keeping knees on floor. Bend arms to lower body. Keep body straight from knees. Arms must be fully extended. Chest must touch floor to complete one movement.

EXERCISE 5—Run on one spot of floor. Count one step each time right foot touches floor. Lift feet about four inches. Every 75 steps do 10 scissors jumps. To do scissors jumps stand with right leg, left arm extended forward (arm shoulder high) and left leg, right arm, extended backward, then jump up and reverse position of legs, arms, before landing.

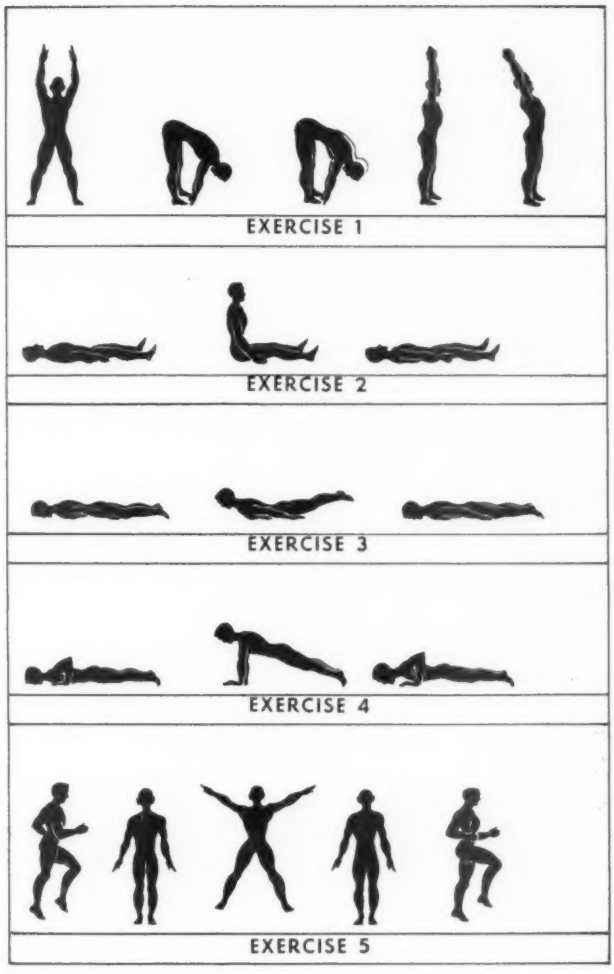


CHART 2

EXERCISE 1—Feet astride, arms up. Touch floor or try to and press (bounce) once, then stretch up and backward. Keep legs straight.

EXERCISE 2—Lie on back, feet six inches apart, arms at sides. Sit up, keep feet on floor. If necessary hook feet under furniture to do so.

EXERCISE 3—Lie face down, palms under thighs. Raise head, shoulders, both legs. Keep legs straight, both thighs must clear palms.

EXERCISE 4—Lie face down, hands under shoulder, palms flat on floor. Straighten arms to lift body with palms and toes on floor. Back must be straight. Chest must touch floor for each movement.

EXERCISE 5—Run on one spot on floor. Count one step each time right foot touches floor. Lift feet about four inches. After every 75 steps, 10 astride jumps. For astride jumps, put feet together, arms at side, jump to feet astride with arms swinging sideways overhead, then return to a starting position. Keep arms straight in astride jumps and raise above head level.

Scouting's highest award to Eastern Airlines' captain

Eastern Air Lines photo

***SILVER BEAVER AWARD** of the Boy Scouts of America — scouting's highest and most coveted award—was conferred on Miami-based, Captain E. Q. Ford of Eastern Air Lines. The sole recipient of that award from the entire south Florida area, Captain Ford has been active in scouting since 1918.*

North Central captain made reserve Lt. Cmdr.

U. S. Navy Photo

J. M. Pietro

The United States Navy Department announced recently that Lieutenant Joseph M. Pietro of the United States Naval Reserve had been promoted to Lieutenant Commander.

LCDR Pietro was graduated from the National Mine High School in 1942 and immediately enlisted in the United States Navy as a Hospital Corpsman, and sent to the Hospital Corps School at Great Lakes, Illinois. He was graduated from the Hospital Corps School in 1943 and served with the Hospital Corps until 1944 when he was accepted into the V-5 Program of the Navy and then sent to the Naval Air Station at Pensacola, Florida, for training as cadet.

Upon graduating as a Naval Pilot, Mr. Pietro was assigned to the Military Air Transport Service with Transport Squadron VR-3 in the Pacific Area. Subsequently he also served with Transport Squadrons, VR-6, VR-7, VR-8, until his release to inactive duty at the end of World War II.

Mr. Pietro joined North Central Airlines as a First Officer in 1956, and in 1958 was advanced to Airlines Captain. His flying logbook shows more than fourteen thousand hours in multi-engine planes.

LCDR. Pietro lives with his wife, Helen, and their two children, Bruce, 8, and Anne Marie, 7, at 14607 S. Albany St., Posen, Illinois.

LCDR. Pietro is now attached to Naval Air Reserve Squadron VR-724 at the Naval Air Station, Glenview, Ill., where he is the check-out pilot for the Squadron.

"Project SCAN" to collect near collision reports from pilots and to report statistics only to FAA

ON June 8, it was formally announced that the Flight Safety Foundation had been chosen to collect and anaylze mid-air near collision reports. Designated as "Project SCAN" (System for Collection and Analysis of Near-collision reports), this program went into effect July 1, and covers all aircraft operations—civil and military — in the 50 states, the District of Columbia and Puerto Rico.

Initiated by pilots

Pilots have been aware of the problem of mid-air collisions almost since the day there were more than two aircraft in the sky. As the speed of planes increased and the skyways became increasingly busy with aircraft of all types—air lines, business, private and military—the need to do something about the problem became more and more apparent.

The first so-called "organization" attention to the near-collision problem occurred in 1954 at a meeting of air line chief pilots in Dallas, Texas. There the problem was discussed at great length and depth and it was agreed that a program for reporting near-collisions should be established. The Air Line Pilots Association, therefore, formally requested the Civil Aeronautics Administration to undertake such a program, but one that would assure immunity to the reporting pilots.

The Administrator of the CAA studied the ALPA request and then reported that in view of the immunity stipulation which was contrary to his agency's safety enforcement responsibilities, it would be impossible for the CAA to legally establish such a program. He suggested it was one the Civil Aeronautics Board should undertake.

CAB runs program

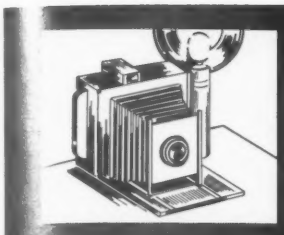
A request was directed to the CAB in 1955, and in 1956 the Civil Aeronautics Board approved a program of Voluntary Pilot Reports of Near Mid-Air Collisions. All segments of the industry, military and civil, cooperated in this program.

Meanwhile, in 1954, the Air Transport Association had begun its own independent survey of near-collision incidents, and the miltary, too, was conducting studies of near-collisions involving its aircraft.

Almost immediately after the CAB initiated its program of voluntary pilot reports of incidents, the reports began coming in. The CAB began issuing statistical reports to the public on a quarterly basis in March, 1957, its final report appearing in May, 1958. In July of that year the Board concluded that its objective of collecting and assembling near-collision statistics had been achieved and no further benefit would result from continuance of the program. Therefore, the Near-Collision Reporting Program of the CAB was officially terminated as of July, 1959. Soon thereafter the Federal Aviation Agency took over the CAB's Incident Reporting Program. When it became known, however, that reporting pilots would be subject to disciplinary action, the pilots became reluctant to submit reports, and so the previous "many" became but a few.

But—in December, 1960, the con- Canada, but also from such places as

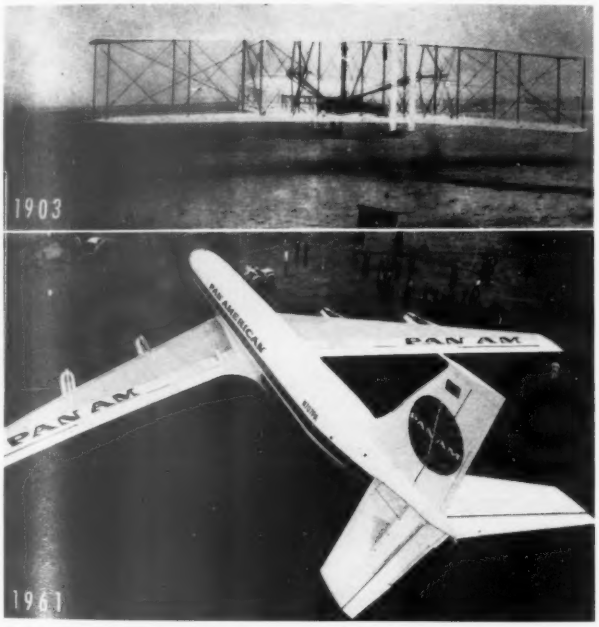
(Continued on page 22)



The ALPA Camera

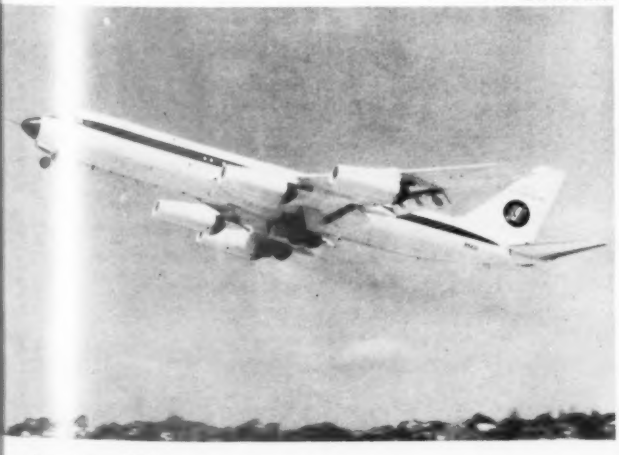
Some Highlights and Sidelights of the News and ALPA in Pictures

Pan American Photo



PROGRESS NOTE: On its first flight the Wright brothers' "box kite" reached a top speed of 31 mph and flew 120 feet or about 20 feet less than the wing span of Pan Am's Boeing jet clipper which travels around 600 mph.

U.P.I. Photo



Associated Press Wirephoto

DENVER—The wreck of the UAL DC-8 which crashed while landing at Stapleton Field, July 11. Of the 122 persons aboard, 16 were killed and the seventeenth victim was a man in a truck. According to early press reports the plane's hydraulic system was mal-functioning. The plane swerved off the runway, struck a truck, and caught fire.

Trans-Texas Airways Photo

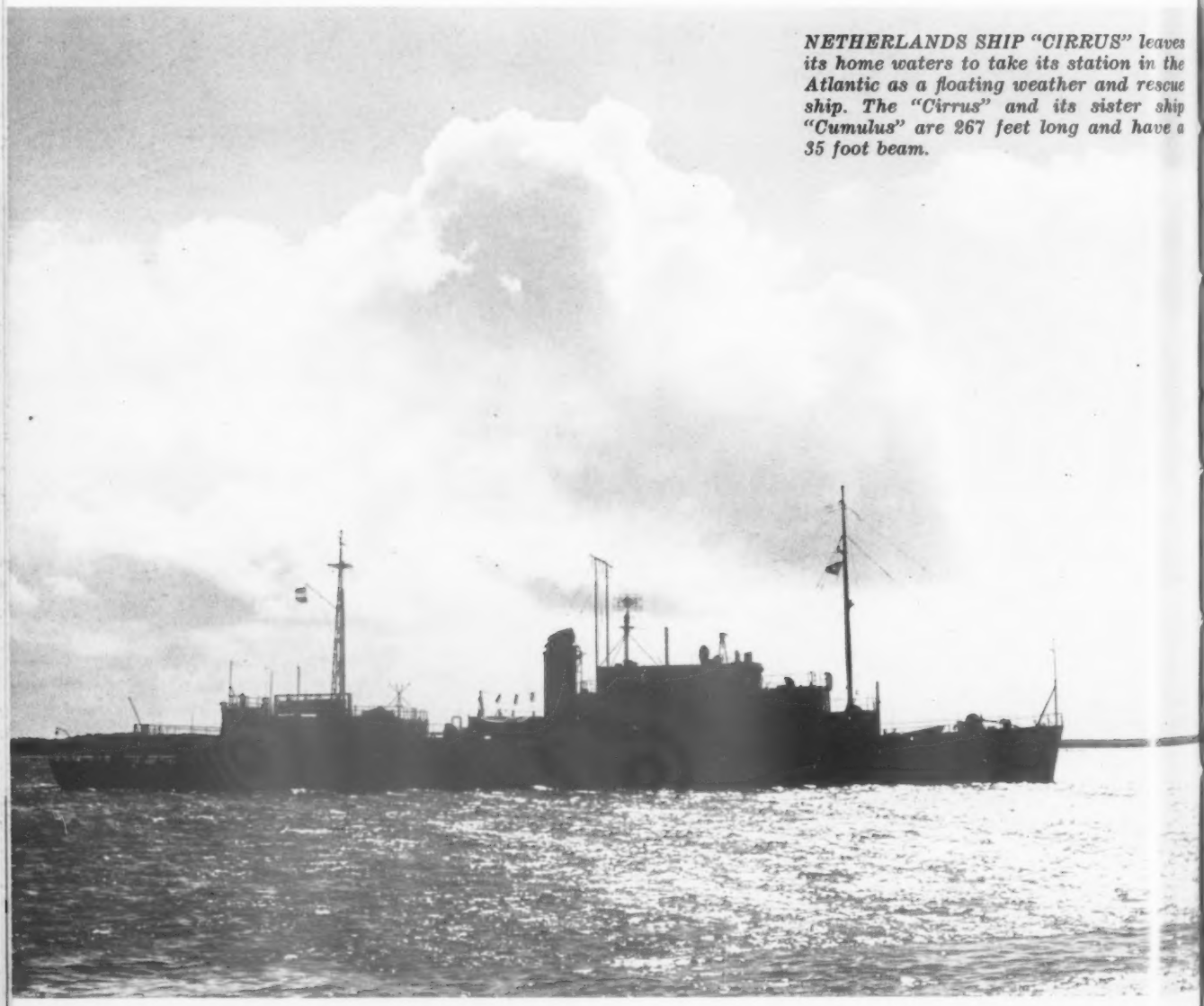
TRANS-TEXAS AIRWAYS has added seven Convair 240s to its fleet and plans to purchase a total of 22 from American Airlines. It now has 25, DC-3s.

CONVAIR 990 has flown faster than any other passenger transport in the world—mach .97 at an altitude of 22,500, or a true air speed of 675 mph. The 990 will be certified for mach .91 flight when it is introduced on commercial air lines the end of this year.

ICAO OCEAN STATIONS AT WORK

The seldom told story of nine North Atlantic weather ships which provide meterological data, radar fixes, and stand by for rescue work for ships and airplanes.

Story and photographs by courtesy of International Civil Aviation Organization Bulletin, Montreal, Canada.



NETHERLANDS SHIP "CIRRUS" leaves its home waters to take its station in the Atlantic as a floating weather and rescue ship. The "Cirrus" and its sister ship "Cumulus" are 267 feet long and have a 35 foot beam.

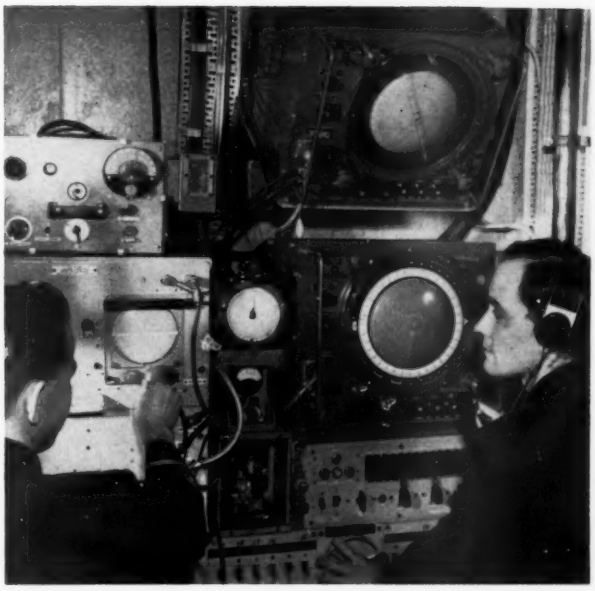
FOR more than a century—since 1853—merchant ships of many nations have contributed voluntarily to meteorology by regularly making and recording weather observations while sailing the seven seas. In 1878 earlier efforts were coordinated by the formation of the International Meteorological Organization (IMO), the predecessor of the World Meteorological Organization (WMO). Since then, millions and millions of observations have been recorded and transmitted to land stations by ships.

At present about 2,500 commercial vessels are participating in the WMO scheme which divides the reporting vessels into the following three categories: selected ships provided with tested MET instruments on loan which make very comprehensive surface observations and transmit the data to various MET stations ashore every six hours; supplementary ships supplied on loan with modified sets of instruments with which more limited observations are made; and, auxiliary ships which use their own instruments to make basic observations which are transmitted in a very abbreviated form.

Obviously, this work has been of great importance to meteorologists who would be limited to a very incomplete picture of the weather if they were forced to work with only the data they could obtain from land stations. More was needed, however, than the observations carried out by the merchant ships when civil aviation began its rapid development after 1945—a development which has seen the aircraft overtake the ocean liner as the major means of passenger transport between Europe and North American within fifteen years.

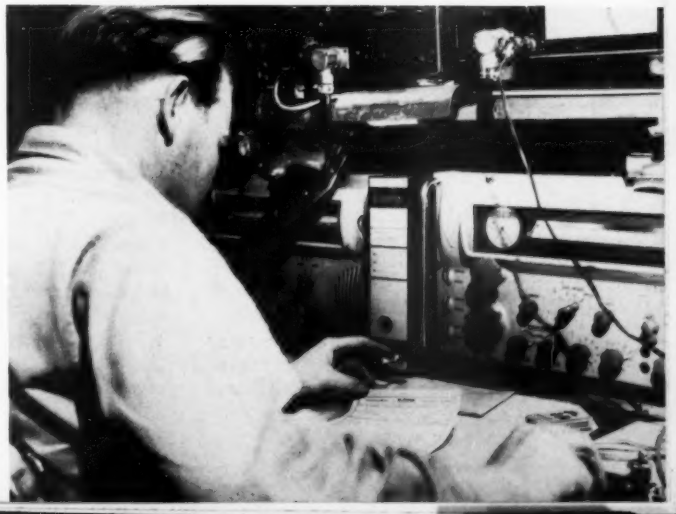
The WMO data was not adequate, because the airliner needs meteorological information about the atmosphere up to 20,000 feet—or in the case of jets up to 60,000 feet. Aviation made imperative the need for a system of forecasting so exact and reliable that airlines can work out flight plans which avoid headwinds and other unfavorable weather and take advantage of tailwinds.

Such a system was agreed upon in 1946 when the International Civil Avia-



TWO RADAR technicians tracking a newly released weather balloon with their instruments aboard a Canadian weather ship station.

WEATHER BUREAU observer seated at a radiosonde receiver-recorder aboard USCGC "Absecon." Meteorological data from balloon-borne radiosonde is recorded on a moving graphic tape. Data from station "Charlie" is transmitted via Coast Guard radio to U.S. Weather Bureau.



RADIO OPERATOR of Dutch ship "Cirrus" transmits weather data to shore stations. The Netherlands operates two weather ships—the "Cirrus" and the "Cumulus"—with a registered tonnage of 1,930 each. (Ship on facing page is the "Cirrus".)

RADIO ROOM of "France II" showing the consols used for communication with air traffic. This ship and its sister ship "France I" are new ships 243 feet long and can do 15 knots. They carry a complement of 53—crew and technicians; quarters are provided for 16 survivors.

tion Organization, supported by the IMO, decided to maintain thirteen of the ocean stations established in the North Atlantic during the latter stages of World War II. At these stations radar wind and radiosonde observations of pressure, humidity and temperature to a height of 60,000 feet would be made every six and every twelve hours respectively in addition to ordinary surface observations every three hours. It was agreed that the ocean stations should also provide navigational aid to aircraft in the form of radio and radar fixes for instance, that they should provide supplementary air traffic control facilities and, of course, be ready to coordinate or assist in search and rescue services whether for aviation or shipping. At the same time it was agreed that the weather ships should be ready to make oceanographic and other scientific observations whenever this could be done without interfering with their primary task.

18 nations cooperate

By 1949 all thirteen stations were in operation; the U. S. A. provided ships for seven stations, the United Kingdom for two, Canada and the U. S. A. jointly for one, and France for one. The Netherlands and Belgium shared the operation of vessels for one station, as did Norway and Sweden.

Thirteen stations soon proved more than adequate to cover the needs of aviation over the North Atlantic and before the year was out their number was reduced by two. In 1954 — this time for reasons of economy — the number of stations was further reduced to nine. Since then, these nine stations have been continuously in operation — the four western stations "Bravo," "Charlie," "Delta" and "Echo" being manned by vessels of the U. S. Coast Guard, while the operation of the five eastern stations "Alfa," "India," "Juliett," "Kilo" and "Mike" have been the joint responsibility of France, the Netherlands, Norway, Sweden and the United Kingdom.

Canada has a responsibility to provide one ship for station "Bravo"; however, under a bilateral arrangement with the United States of America the Canadian Government operates a full station in the North Pacific in partial consideration for which the U. S. A. has assumed Canada's responsibility in respect to "Bravo."

As the North Atlantic is overflown by the airliners of more than the eight operating nations mentioned above and, in addition, not only aviation benefits from the work of the ocean stations, agreement was reached with other governments whereby they share the cost of operation. At the moment eighteen nations in all are contributing to the NAOS Agreement — eleven by pure cash contributions. Each nation's contribution to the scheme is based upon the number of Atlantic crossings by civil aircraft belonging to it plus a share of another factor named "non-aeronautical benefit."

During the thirteen years ICAO weather ships have been in operation, their regular observations of meteorological conditions on the surface and in the upper atmosphere augmented by the regular surface observations made aboard merchant ships, have proved very valuable not only for civil aviation but also for general meteorological purposes. Conferences among the member nations have been held at regular intervals since the beginning, in 1946. The latest—the Fifth North Atlantic Ocean Station Conference—was held at The Hague, Netherlands, in March, 1960, at the suggestion of the Government of the Netherlands; during this meeting adjustments were made to the scale of cash contributions to take into account the prevalent tendency for cost to increase.

For how many decades the ocean weather station will be needed to fulfil all of its present duties is difficult to predict because of rapid progress in

FOR MANY REASONS—especially so that they may be able to give accurate radar fixes—it is extremely important that the vessels are kept within the center square of their station, that is, within an area of ten nautical miles square. This requires no little skill on the part of the watch on the bridge. Any time they move off station—on a search and rescue mission, for instance—warning must be given to the authorities ashore.

new methods of observation including constant level balloons and satellites, in communications and in navigational aid.

However, at this time the importance of the ocean stations to civil aviation is increasing because of the need for high level observations — up to 60,000 feet — caused by the introduction of subsonic jet airliners. This was confirmed earlier this year by the NAOS Agreement States at the meeting at The Hague, mentioned above. Quite apart from the large number of lives saved by the weather ships and the reliable forecasts made possible by the observations of the weather ships, the presence of these nine stations takes a lot of strain off the minds of pilots flying the North Atlantic. Nearly all of them agree that it is not only a question of the convenience of radio or radar fixes or of communication relay, but that conversation with a weather ship radio operator directly below is a comforting thing in itself when you are hundreds of miles from the nearest land.

Those who serve on the ocean station vessels for some time develop into hardy types if they were not so in the first place. There is a big difference between encountering occasional storms during transatlantic crossings as merchant ships do, and having to remain on station week after week and take whatever weather happens to pass your station without much possibility of avoiding the worst by dodging the storm centers. And then there is the steady crossing out of calendar dates, with its required philosophical attitude. A little taped speech mentioning the work of the ocean station vessels might well be piped to the comfortably reclining thousands who fly across the North Atlantic and the Northern Pacific.

Ocean station's manual

The rules and regulations governing the equipment and the operation of the weather ships are contained in a 40-page ICAO document—the *Ocean Station Vessel Manual*—which is divided into five sections covering general information, meteorology, search and rescue, communications, and oceanography and observations for other scientific purposes.

A closer look at these sections will convey an idea of the complexity of the operations. The first one contains definitions of the terms used including the three phases of aircraft emergency —the uncertainty phase, the alert phase and the distress phase—and it sets down the priority of services provided by the weather ships which varies in the following manner according to which phase is in force at a particular time:

—During normal conditions: Meteorology, navigational aid.

—During an uncertainty phase: Navigational aid; meteorology; search and rescue.

—During an alert phase: Navigational aid; search and rescue; meteorology.

—During a distress phase: Search and rescue; navigational aid; meteorology.

The section on meteorology prescribes that copies of all regular surface and upper air MET observations are to be made available to all participating States and that statistical, meteorological records and summaries of the observations shall be maintained in standard form and must be forwarded to ICAO.

The number and the extent of observations is considerable. Surface observations are made eight times daily and include all the elements prescribed by the WMO for ships' observations. Upper wind observations must be made, normally by radar methods, not less than four times daily to an altitude of at least 55,000 feet. Upper air temperature, pressure and humidity observations must be made twice daily and preferably four times daily.

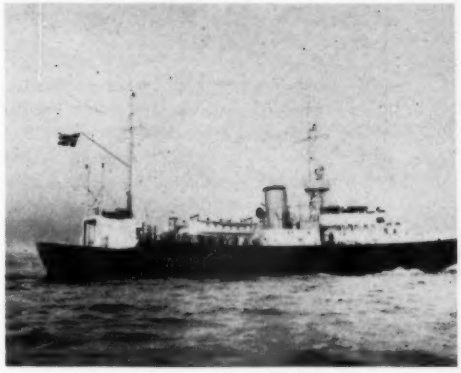
The transmission of reports of observations from a weather ship to an aircraft may be either in plain language or Q code or in the appropriate international meteorological code according to whichever method is requested by the aircraft.

The following equipment is listed as essential to carry out the routine observations of a weather ship: ship's thermometer screen, dry and wet bulb thermometers, ventilated psychrometer, sea surface temperature measuring equipment (precision type), marine mercurial barometer, precision aneroid barometer, open scale barograph, cloud height balloon equipment, anemometer, wind direction vane, radar or radio wind finding equipment, radiosonde equipment, consumable stores such as helium or hydrogen, balloons, etc.

In addition, the following instruments are recommended as desirable supplementary equipment: cloud searchlight (or ceiling light projector), marine theodolite, thermograph (both air and sea)*, hygrograph or wet bulb thermograph*, rain gauge, and visibility meter.

The minimum accommodation and stores required are listed as MET offices, radar control room, balloon inflation shelter, obstruction-free balloon release area, helium or hydrogen store and radiosonde preparation room if the type of equipment used makes it necessary.

*These instruments may be distant recording.



"POLAR FRONT II," making a landfall after being relieved at Ocean Station "Mike" by her sister ship "Polar Front I." The two Norwegian ships are operated jointly by Norway and Sweden. They are converted "Flower" class British corvettes of the same type as the majority of the British weather ships.

Observation difficulties

It is quite clear that special care is required in the methods of observation used on a ship because of the frequent adverse conditions, especially as the "Ocean Station Vessel Manual" emphasizes that all weather observations shall be of comparable regularity and reliability to those of first-class land stations.

The methods set out in the Manual read as follows:

In upper air observations by electronic methods, (temperature, humidity, pressure and wind) the radiosonde and radar targets are carried aloft either separately or together by means of a balloon. As far as possible the techniques are those adopted at land stations, using similar apparatus, modified for use on board ship.

In general the precise method of obtaining upper winds will depend on the equipment of the ship. Air search radar or fire control radar is used to track the target suspended from the balloon. If a radiosonde is carried by the balloon, the height can be checked or calculated from the observations of temperature, pressure and humidity. Coordination of the duties of the ship's personnel is especially important if good observations (particularly of upper wind) are to be obtained.

ICAO Ocean Stations at Work—continued

Because the range of radar apparatus is limited and because most air search radar cannot scan above an elevation of 60° to 70°, it is necessary to direct the motion of the ship during an upper wind sounding and then to make due allowance for the ship's movement in calculating the winds.

In light winds the ship should be steamed into wind, thus reducing the elevation angle and preventing the target entering the cone of radar silence.

In strong winds the slant range increases very rapidly so that the target would pass beyond radar range very quickly at a relatively low altitude. The length of time during which it is within range, and consequently the altitude to which it can be followed, is increased if the ship steams downwind in the track of the balloon.

It may be necessary to avoid having the balloon at certain azimuths since the ship's superstructure may cause small shielded sectors. Trials will determine these points.

When any atmospheric phenomena are observed on the radarscope, the weather observer on duty shall be notified. The weather observer will prepare reports in plain language for ground-to-air transmission as required and in nationally adopted codes for ship-to-shore transmission.

Hundreds rescued

The rule which governs the employment of weather ships in search and rescue operations is very clear. It says: "If an ocean station vessel is able to lend assistance to an aircraft or vessel in distress, or survivors from same, it shall immediately grant priority of service to search and rescue."

It happens quite often that the Commanding Officer of a weather ship is delegated by a rescue co-ordination center to control search and rescue at the scene of the incident. In these cases, the Commanding Officer of the vessel is expected to assign search areas, ensure complete coverage by plotting the aircraft's areas of search, act as communication center and relay point, and prevent hazardous concentration of search aircraft in any one sector.

The decision to leave the ocean station is based on a careful judgment of the probability of rescue, weighed against the hazards to air traffic created by the ship's absence. According to the Manual, the vessel shall go on a search and rescue mission only when, in the opinion of the Commanding Officer, there is a reasonable chance of succeeding; in practice, however, it is doubtful whether life has been lost because a Captain judged the probability of rescue too small and decided to stay on station.

An example of the effort which a weather ship will spend on trying to locate and help an aircraft or a ship in distress, even under the most appalling conditions, was the unsuccessful search for the Danish motor vessel "Hans Hedtoft" which was lost towards the end of January last year with nearly 100 people aboard after having struck an iceburg near Greenland. The U. S. weather ship "Campbell" left station "Bravo" on 31 January, 1959, to search for and co-ordinate aerial surface search for the Danish vessel, specially designed for winter navigation between Greenland and Denmark. For nearly a week the search was carried on in spite of extremely dangerous ice conditions and very bad weather. Before the "Campbell" returned to station "Bravo" on 7 February it was obvious that there was no hope of survivors.

Other search and rescue efforts of the ICAO weather ships have been more successful. Since 1953 no less than 253 lives have been saved, most of them after marine accidents. The effort spent on search and rescue assignments varies greatly and is unpredictable. During several years in the fifties, for instance, it averaged about 450 miles per life saved, whereas during the past two years it has been as high as 3,800 miles per life saved. This, however, is a matter of pure chance. The aggregate distance run by ocean station vessels on search and rescue assignments usually varies between 10,000 and 30,000 nautical miles annually and is not proportionate to the number of lives saved.

Ocean ditchings

By far the greater number of persons saved have come to grief in ships than in aircraft. One has to go back more than ten years—to the forced landing of the flying boat "Bermuda Queen"—for an example of a weather ship rescuing a large number of air travellers. Apart from this one incident which was completely successful, as everyone was saved, only military aircraft have ditched with the assistance of ICAO weather ships. The Manual recommends several means of assisting pilots who have decided to ditch their aircraft, apart from providing him with all the necessary air navigational information that he needs.

When visibility is poor, the weather ship may lay out a flare path consisting of eight to ten lighted floats at intervals of approximately 100 yards along the track of ditching indicated by the pilot, at the same time training a searchlight beam horizontally in the direction of the ditching. During the daytime smoke floats may be laid out to indicate surface wind direction and the aircraft may be guided to the flare path by radio and radar bearings.

Under certain conditions it is possible for the weather ship to smooth the seas by turning three or more circles with a diameter of more than one mile or by laying an oil slick.

Whenever there is an opportunity, the weather ship personnel are exercised in the use of search and rescue equipment and first aid kits.

Communications

The communication procedures used by the weather ships are the general radio regulations of the ITU for the mobile service and the current communication procedures contained in Annex 10 to the Chicago Convention in communication with stations of the aeronautical service. For radio-tele-

LAUNCHING of "France I" in February 1959. French weather ships are the only ones built specifically for this purpose They are twin-propeller, diesel-electric powered ships.

phony ICAO procedures are used.

The ocean station vessels maintain several aeronautical mobile communication watches in the medium, high, very high, and ultra-high frequency bands. The MF distress channel on 500 c/s is monitored continuously in accordance with the radio regulations of the International Telecommunication Union.

Another important function of the ocean weather ships is their service as relay stations when aircraft and aeronautical land stations are unable to establish contact with each other for the transmission of position reports, urgent NOTAMS, urgent MET messages or important operational messages (diversions, major changes in flight plans, etc.) They will not, however, relay administrative or non-operational messages from aircraft.

Generally aircraft flying within VHF range of ocean station vessels report their positions and give other pertinent information regarding the flight plan.

As a rule radio beacons are only operated on request. During a distress or special mission, however, the beacon may be operated without request for the guidance of aircraft or ships but even during emergencies, continuous beacon operation shall be suspended often enough and long enough to prevent interference to essential communications connected with the search and rescue operations.

The identification signals used in connection with the beacon are normally made up of the last two letters of the station call sign and a final pair of letters which indicates whether the vessel is on station or not. If the weather ship manning ocean station "Alfa" whose call sign is 4YA is in the center square, for instance, it will transmit YAOS at 20-second intervals. If the same ship is out of the center square, but still on station, it will transmit two letters which indicate its position in the grid. If the signal, for instance, is YAIM, it indicates that the ship's crew has fixed her position in the square IM which would then mean that the vessal bears 56°30′ to 37 nautical miles from the 62°N, 33°W center square position of "Alfa."

The number of radar fixes furnished by the individual ocean stations vary greatly. In 1959, for example, station Charlie" furnished 11,154 fixes, while Mike" was asked for only 160. The total number of fixes provided by all stations in 1959 was very close to 6,000.

The number of direction finding bearings is much smaller. For 1959, the total was below 3,400 and two stations, "Bravo" and "Echo," were asked for only one fix each.

Cost of operation

It has already been mentioned that the number of Ocean Stations was reduced to nine in 1954 in order to ease the burden of the cost of operation. The ICAO Conferences on North Atlantic Ocean Stations which have met from time to time, as well as two permanent bodies, the Advisory Committee of European Operating States, headed by Cmdr. C. E. N. Frankcom of the United Kingdom and the ICAO Committee on Joint Support of Air Navigation Services, the present chairman of which is Nelson B. David, Representative of the U. S. A. on the ICAO Council, attempt to ensure that the nine stations in the North Atlantic are operated in the most efficient and economical way possible.

While it is difficult to assess the actual cost of the operation of all the ocean vessels involved because some of them are used for other purposes as well, the 1959 figures for the ships used solely for ocean weather station services show that the cost of operation of these ships varies between $270,000 for the least expensive ship to $435,000 for the most modern and expensive ships. This means that for each of the nearly one million and a half passengers who flew across the North Atlantic in 1959 only a few dollars were spent for the indispensable services of the ICAO weather ships. This figure is as insignificant compared to the total price of the ticket as are the ten million dollars spent on the ocean weather stations compared to the hundreds of millions of dollars invested all over the globe in other necessary aviation facilities such as runways, terminals, air navigation aids, etc. All the weather ships put together cost only slightly more to operate in a year than the purchase price with necessary spares of one of the jetliners crossing the North Atlantic seven miles above the changing sea.

Legal rights of military reservists

By JOHN P. O'BRIEN, *Attorney, Legal Department, ALPA.*

The Universal Military Training and Service Act was amended effective September 10, 1960, and expanded the protection afforded to reservists and guardsmen against losses of seniority, status, pay and vacation while they are away from their jobs on training duty. The Act, as amended, provides that reservists and guardsmen shall be granted a leave of absence, upon request, for the purpose of performing training duty with the armed forces of the United States or the National Guard and shall be entitled to reinstatement with an employer after performing:

—Weekly and weekend drills.

—Annual tours of training duty.

—Special courses of instruction and other types of reserve training covered by federal statutes.

To obtain the benefits and protections of the amendments you:

—Must request a leave of absence from your employer for any training duty which will require absence from your work,

—Your employer MUST grant the leave requested for the required training,

—Must notify employer of the day and time of regularly scheduled weekly or weekend drills and of any changes in your drill schedule,

—Must submit additional request for any other training duty such as summer camp.

In submitting requests for leave of absence the Department of Labor recommends the use of the following form:

TO:_____

Pursuant to Section 9 (g) (4) of the Universal Military Training and Service Acts, as amended, I hereby request a leave of absence for training in the armed forces or the National Guard as indicated below:

a. For weekly or weekend drills, fill in the following:
Until further notice my drills are scheduled for_____
(day of week)
from_____ to_____
(hour) (hour)

b. For annual tours of active training duty, fill in the following:
Active duty training scheduled for
_____.

c. Other_____
_____.
_____
(Signature)

NAVIGATION PROBLEMS ON THE NORTH ATLANTIC

By FRANK B. BRADY

General Precision, Inc.

It is perhaps trite to say that navigation and traffic control go hand in hand —that you cannot have traffic control without supporting navigational facilities. To go a step further, traffic control is dependent upon the quality of the navigational information available. These are factors well known to this audience.

The extent of the requirement for navigation facilities to support air traffic control is evident from the 927 VOR stations included in the Federal Aviation Agency's plans through 1965. The basic function of a very large percentage of these facilities is not to provide navigational guidance for aircraft operating from Point A to Point B. This could be accomplished by relatively few stations. The requirement for such a large number of facilities is based upon the need for defining airways and fix points necessary for effective traffic control.

What happens when it is not possible to provide a VOR, VORTAC, or TACAN station to define airways and fix points? The answer becomes quite evident from a look at the present situation on the North Atlantic. Lateral separation requirements are expanded to twelve times the width of their domestic counterpart, and longitudinal separation is increased three-fold to insure safe separation between successive aircraft. Current separation criteria requires an aircraft to operate within an exclusive area 120 miles wide by 30 minutes long, and with 1,000 feet vertical separation to 29,000 feet, and 2,000 feet vertical separation above this altitude. Aircraft position reports are normally required every 10 degrees of longitude, although on high-speed aircraft, this spacing may be increased somewhat. These enormous blocks of airspace are necessary only because of the lack of precise navigational information on a continuous basis.

Several Methods Used

North Atlantic operators at present rely on a combination of methods of navigation. Most route approvals are based upon the use of celestial navigation, although in actual practice much use is made of electronic systems. Standard LORAN, CONSOLAN, and ADF are used most frequently. VOR and DECCA are used near the terminal areas, but because of their limited range are not useable enroute. The introduction of aids such as LORAN C and DECTRA may be used to provide greater coverage. It must be recognized, however, that these aids require the addition of airborne equipment, as well as large installations of ground equipment, and that it is unlikely that extensive operational use will be made of them for some years to come. Tests are now being conducted on the use of VORTAC aboard an ocean station vessel. This subject is being covered in some detail by the FAA member of this panel. If successful, these ship-installed VORTAC stations will provide additional intermediate fix points in areas of the ocean which now are provided with only limited service by existing electronic aids. It will not be necessary for aircraft to overhead the ocean station vessel to obtain a fix, providing complete VORTAC equipment is carried aboard the aircraft. Each of the electronic navigation systems mentioned has its own peculiar strengths and weaknesses, and these must be taken into account by the user to properly evaluate the information supplied. For instance, with standard LORAN, careful attention must be paid to night effects (skywave), or erroneous readings will result. Similar problems are encountered with DECCA and LORAN C, which are also hyperbolic systems. VOR, being a line-of-sight system and limited in range, cannot provide continuous coverage over ocean routes.

Celestial Navigation

Celestial navigation, which has been the backbone of over-ocean navigation for a number of years, has encountered some serious problems with the advent of the high-speed jet. Entire flights are made where the sun is very low on the horizon, the moon is not available, and there is too much light for taking star shots. Under these conditions, good celestial fixes or lines of position are for all practical purposes unavailable. Furthermore, the speed of the aircraft is such that after taking star shots and making the necessary computations, the fix which is obtained is almost a matter of history. Because of rapidly changing winds, it is possible for an aircraft to deviate a considerable amount from its

Courtesy General Precision, Inc.

This article based on his speech to the Oceanic Control Panel of the International Conference of the Air Traffic Control Association, San Francisco, October 3 - 5, 1960.

intended course before this becomes known to the pilot or navigator. Flight crews report difficulty in keeping up with the navigation workload on the high-speed aircraft. A heavily contributing factor is the multiplicity of navigational aids and methods which must be used by the flight crew to obtain full coverage under various conditions encountered, such as sky cover preventing celestial fixes, auroral disturbances interfering with electronic navigation, and atmospheric static interference to low-frequency radio navigation systems. No single system currently in use can be depended upon on a continuing basis throughout a flight. Because of the variations in accuracy of the different methods in use, and the conditions under which the information is obtained, position reports received from aircraft in over-ocean flying are frequently open to question.

Technical Conference

At the Technical Conference of the International Air Transport Association, held in Lucerne, Switzerland, in May, 1960, these problems were discussed in great detail. Significant conclusions were drawn at this meeting. To quote the report:

". . . In comparison with navigation processes heretofore used, Doppler radar was felt to offer a number of immediate operational gains, e.g.:

i) Capability to measure accurately ground speed and wind drifts and to provide continuity of latest basic navigational information.

ii) As an automatic dead reckoning device and integration aid, Doppler Radar greatly reduces cockpit workload. Increased speeds of jet aircraft call for improved navigation aids in the aircraft, since otherwise the task and workload of the navigator using conventional methods would be greatly increased and would have to be very carefully programmed throughout the flight.

iii) Doppler Radar also makes possible improvements in navigation accuracy and track-keeping and extra-polation of the range of ground-based navigation aids. Although the requirements for ground navaids are thus reduced, the need for the latter is not eliminated due to the necessity for periodic up-dating of Doppler data.

iv) Instantaneous indications of wind drift can reveal errors in weather forecasts and thus improve navigation accuracy by eliminating lateral deviations from the planned track previously caused by inadequate knowledge of the wind situation enroute, and by making possible more accurate forward estimates of aircraft position. Furthermore, wind drift measurements permit selection of more advantageous altitudes in areas where freedom of navigation in the vertical plane is possible.

v) Doppler Radar can assist in determining the point of letdown for turbo-jet aircraft in the vicinity of terminal area, and in executing the descent.

vi) Doppler Radar offers long-term prospects of reduction in the amount of fuel reserves carried, especially on long-range flights."

Advantages of Doppler

These conclusions, drawn by a knowledgeable group of air line operators, have much significance in oceanic traffic control. It is appropriate to consider some of the advantages in more detail.

(A) The fact that doppler navigation is self-contained within the aircraft means relative freedom from ground-based navigational aids. This lack of dependence upon fixed ground aids permits a high degree of flexibility in choice of routes. Frontal areas can be easily bypassed, advantage can be taken of jet streams, and head winds can be avoided. Simple cockpit instrumentation permits these changes to be made from the original flight plan with minimum workload. Since most over-ocean flights are now made on the basis of least-time-track, the flexibility provided by this system will be of great advantage to the flight crew, the dispatcher, and the traffic controller.

(B) Increased navigational accuracy provided by doppler should permit a substantial reduction in oceanic separation criteria. Referring to the North Atlantic problem, the IATA group estimated that aircraft equipped with doppler radar could limit their extreme lateral deviation from track to twenty-five nautical miles, and that lateral separation criteria could be reduced to approximately one-half of the present value. Furthermore, it was considered feasible to reduce longitudinal separation to fifteen minutes, instead of the present thirty minutes, because of the improved ability to monitor and to better estimated progress along track.

"THE LAZY BUM"
by Q. E. D.

"You mean to say, he just sat there doing nothing?"

"Yes sir. He let that damned great mass of expensive equipment to go tearing on towards the end of the runway until—"

"And never even used the emergency brakes?"

"No sir. Never once."

"The lazy bum."

"Sure thing, the lazy bum. Just sat there doing nothing. Not a thing."

"Sal! Same again, please. One Rhinegold, one Ballentine. Yes, Sal, Ballentine ale."

—from The Log, The Official Journal of the British Air Line Pilots Association, February, 1961.

(C) The capability of doppler-equipped aircraft to determine ground speed with an accuracy of one percent or better, and the ability to show immediate changes in ground speed resulting from changing wind conditions makes it possible to provide much more accurate reports of ETA and to update such reports based on changing conditions.

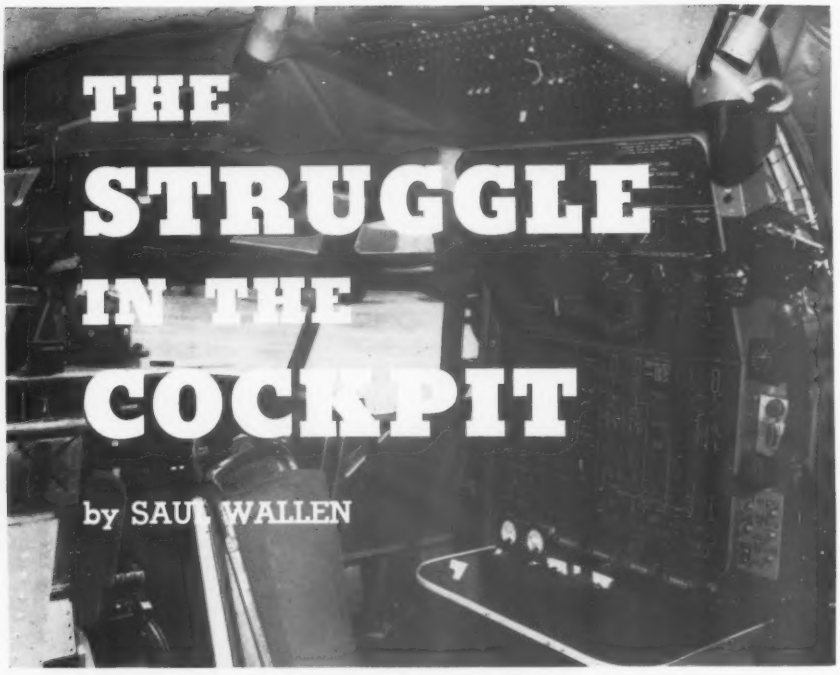
(D) The use of doppler on various air line evaluation programs has shown it to be very useful in the detection of discrepancies between forecast and actual wind values. This information, reported to ARTC, has been found useful in adjusting the estimates of aircraft in the area. In fact, one of the most promising future uses of doppler equipment carried aboard air line aircraft is the greatly improved reporting of wind information which will result. A better knowledge of wind information in areas where reports are now scarce or nonexistent can be of benefit, not only to the aircraft carrying doppler, but to other aircraft. In addition, the data can form a new input to the general weather reporting and forecasting system.

(E) Improved knowledge of along-track position has been found very useful, particularly for jet aircraft, in starting letdown into a terminal area. This improved knowledge of along-track and cross-track position is of aid to radar identification of an aircraft, and should reduce the need for identification maneuvers.

Doppler System Best

In summary, doppler navigation equipment, employed with suitable computer and heading reference systems, offers the possibility of filling the navigational gaps which now exist in ocean routes, and when judiciously used in conjunction with ground aids should permit very substantial reductions in separation criteria now in effect. The fact that the system is automatic, self-contained, and is not adversely affected by terrain or weather, offers to flight crews and traffic controllers a major improvement in providing continuously available, accurate navigational information. The extent to which these improvements are realized will depend largely upon the number of air line fleets which are equipped with doppler and the extent to which traffic controllers exploit the advantages of the improved information.

Courtesy General Precision, Inc.



THE STRUGGLE IN THE COCKPIT

by SAUL WALLEN

A professional arbitrator and mediator of labor disputes, Saul Wallen served as a member of emergency boards appointed by Presidents Truman and Eisenhower to deal with the disputes between the airline pilots and the flight engineers. Mr. Wallen here gives his proposals for a final solution to the differences between the pilots and engineers.

THE narrow door that separates the cabin from the cockpit of the airliner that takes you to Cairo or Chicago, to San Juan or San Francisco, conceals a contest of wills and a clash of egos that the government has so far been unable to conciliate and that the protagonists have so far been unwilling to terminate.

The flight crews on the nation's major airlines are deeply divided over the interrelationship of their functions. The pilots contend that the conditions created by the introduction of high-speed pure jet aircraft require a cockpit crew consisting of a pilot, a copilot, and a flight engineer, all of whom should possess the basic skills and orientation of a pilot, and that only with such a crew can optimum safety be achieved. The flight engineers contend that the cause of safety is equally well served by carrying a flight engineer on the aircraft who has specialized training as an aircraft and engine mechanic, and that he need not possess pilot skills.

This issue of whether modern aircraft should be manned by a crew all of whom possess the same skill and pursue the same career or by a crew composed of men of separate skills pursuing separate careers has plagued the airlines for nearly a decade. In February, 1961, it manifested itself in the most comprehensive and costly strike in aviation history.

Allegedly of the wildcat variety, this strike involved the 3,500 flight engineers belonging to the Flight Engineers International Association employed on the six major airlines which man their planes with flight engineers who possess the background and basic skills of aircraft mechanics. Unaffected and continuing to fly were the eight airlines whose flight engineers have the basic qualifications of pilots and who, along with the 14,000 pilots and copilots on all airlines, belong to the Air Line Pilots Association. Both unions are affiliated with the AFL-CIO.

According to Civil Air Regulations, the duty of a flight engineer during flight is to assist the pilots in the mechanical operation of an airplane. The flight engineer monitors the functioning of and makes adjustments in the mechanical, hydraulic, fuel, and electrical systems of the aircraft. He records signs of incipient or actual malfunction in a logbook for referral to the carrier's mechanical maintenance department. Prior to take-off he makes an inspection of the aircraft to be certain that it has been properly serviced.

The pilot and copilot are responsible for flying the aircraft, plotting its course, receiving signals, and maintaining communications with ground stations.

In domestic commercial air transport, until 1947 aircraft were manned by a pilot and copilot. After the occurrence of several commercial airplane accidents in 1947, President Truman created a special board of inquiry which recommended that the Civil Aeronautics Board hold hearings to determine whether or not additional help in the cockpit was required to assist the pilots of commercial aircraft. The pilots, through the A.L.P.A., advocated adding to the flight crew a third man to assist the pilots in the operation of the large, four-engine aircraft then newly in use. In 1947, the C.A.B., over the initial objections of the carriers, issued a draft regulation requiring that, on aircraft certified for more than 80,000 pounds maximum take-off weight, "An airman holding a flight engineer's certificate shall be required solely as a flight engineer." This regulation affected various aircraft then in use, such as the Douglas DC-6 and Boeing 377.

Some carriers objected to the use of the phrase "solely as a flight engineer" in the draft regulation because it would tend to restrict their "freedom of action in developing multiple function programs for flight crews and better utilization of crew time. . . ." As a result, the phrase "solely as a flight engineer" was deleted. As the final regulation was phrased, the air lines could choose whether the man in the third seat should have the basic qualifications and training of a ground mechanic or the

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basic qualifications and training of a pilot.

Of the major carriers, American, TWA, Eastern, Pan American, National, Continental, Northwest, and Western utilized mechanic-qualified engineers. On the other hand, Braniff, Capital, Delta, Northeast, and Panagra elected to recruit flight engineers qualified to become pilots and to progress them from flight engineer to copilot to captain. United Airlines maintained a mechanic qualification for its flight engineers until 1954, when it announced a switch to the pilot-qualified flight engineer program. Continental switched from mechanic- to pilot-qualified engineers in 1959, and Western Airlines is in the process of doing so now. These latter three carriers were involved in costly strikes of flight engineers as a result.

The carriers which chose the pilot-engineer route developed flight crews with integrated duties and a career goal in which there was a line of job progression. Those which chose mechanic engineers developed flight crews with specialized and delimited duties and functions and with separate and specialized career goals. The flight engineer's job was a dead-end job.

The development of the mechanic-engineer specialty and the granting of separate jurisdictions for purposes of collective bargaining have created conflicts of status and clashes of ego. Since their career aims were not integrated with those of pilots, the engineers tended to try to enhance their specialty and play up its importance in order to justify their demands on the carrier for higher pay. On their part, the pilots, keenly aware that the engineer was placed in the cockpit to assist them, were increasingly irked by the pursuit by the flight engineers of separate economic and career goals. The captain has command responsibility, and while the mechanic engineers have always acknowledged it, the increasing rigidity of the job structure of the cockpit crew fostered psychological and emotional tensions among crew members. These tensions broke out into open conflict in 1955, when the mechanic engineers on United struck for fifty-one days against that carriers' decision to require its engineers to become qualified as pilots, and the pilots, ignoring F.E.I.A. picket lines, continued to fly during the strike.

But the truly sharp conflict between the pilots and the engineers broke out with the advent of the jets. Whereas the fastest previous commercial aircraft operated at a speed of 350 miles per hour, the new pure jet planes were designed to cruise at nearly 600 miles per hour. The introduction into the nation's air lanes of these much faster planes created concern about the ability of the traffic control system to handle the jets.

The pilots maintained that the pure jets would impose on the pilot and copilot a significantly greater burden of work and responsibility in flight planning and communications and that the work load involved in monitoring the instruments associated with the plane's flight and in establishing radio fixes to keep the plane on course would be greatly intensified. At the same time, they contended, the new aircraft were designed with many alternative systems and relays which would become automatically operative in the event of a mechanical malfunction, and as a consequence, the work load of the flight engineer would diminish. In addition, the pilots argued that the new planes raised to a critical level the problem of a replacement for the pilot, the copilot, or the flight engineer in the event one was incapacitated in flight. In the negotiation of the new collective bargaining contracts on the major air lines in 1957 and 1958, the A.L.P.A. demanded a provision that the flight engineer be pilot-qualified and that pilots be offered an opportunity to obtain flight engineer certificates.

The F.E.I.A. responded by serving the same carriers with a demand that the contracts contain a provision that no man would occupy the flight engineer's seat who did not possess, in addition to a flight engineer's certificate, an Aircraft and Engine License issued by the C.A.A. to those who qualify in aircraft and engine overhaul and maintenance. They blasted the A.L.P.A. demand as an attempt by the pilots to force the engineers out of the third seat, so that the pilots, faced with unemployment under the first impact of jet service, could take their jobs.

The carriers were caught in the middle. Each side threatened to strike if its demand was not met. The issue came to a head first on Eastern Airlines, and to forestall a strike, President Eisenhower appointed an emergency board under the Railway Labor Act to hear the disputes and make non-binding recommendations on the merits. In a proceeding which lasted nearly six months, this board heard all parties, took testimony from experts, and recommended that flight engineers who serve on pure jet equipment "be required to have pilot qualifications to the extent of a commercial license and instrument rating and the ability to fly and land the airplane in case of emergency." The carrier was to provide the training at no expense to the flight engineer.

Eastern Airlines and the pilots agreed to accept this recommendation, but the flight engineers balked, maintaining that it would dilute their skills and deprive those unwilling or unable to obtain a commercial license and an instrument rating of an opportunity to fly as flight engineers on the jets. In October, 1958, the flight engineers on Eastern struck, grounding the planes with the aid of the mechanics, whose union, the International Association of Machinists, went on strike in behalf of their own wage demands as well as in support of the engineeres.

The other air lines flying with mechanic engineers were in the same dilemma as Eastern. All were finally rescued from it by the action of American Airlines. American, anxious to be first in the air with the jets and wishing to avoid a strike of pilots on the crew complement issue (it had signed a contract with the engineers on substantially their terms on that issue while the Eastern case was pending), advised its pilots and engineers in December, 1958, that its experts had concluded that the problems of jet operation and the work load on the jets for pilots would call for the services of a third man with pilot qualification, but that since it was committed to carry a mechanic-trained flight engineer, it proposed to place a third pilot in the cockpit of the jet. American's crew on jets would consist of three pilots and an engineer.

This move was calculated to meet the pilots' demand for a fail-safe crew without monkeying with the status or qualifications of the mechanic-qualified engineer. With this proffer, American assumed a multimillion-dollar per year extra payroll cost for what the engineers promptly dubbed a "featherbird."

This solution was the pattern followed by the other air lines flying with mechanic-qualified engineers, including Eastern, where the engineers' strike was settled on the basis of this arrangement. The result has been that, since the advent of the jets, American, Eastern, TWA, Pan American, Western, and Northwest have had four men in a jet cockpit designed for three crew members and an observer. Those air lines which had from the beginning manned their planes with pilot-qualified engineers or which, like United, had switched from a mechanic to a pilot qualification were able to put their jets in the air with three crew members in the cockpit instead of four.

The latest phase in the pilot-engineer struggle opened early in 1960. The A.L.P.A. argued that, since the flight engineers on United are pilot-qualified and since their duties are part and parcel of the duties performed by the pilots, the unit for collective bargaining should be the flight deck crew. It petitioned the National Mediation Board for a ruling that would declare the three stations in the cockpit a single class or craft for the purpose of selecting a collective bargaining agent.

The Mediation Board turned this hot potato over to a special committee consisting of three labor relations experts for determination. This committee held hearings over a six-month period, took over 5,000 pages of testimony from the pilots, the flight engineers, and interveners, and on February 6, 1961, made the determination that "all flight deck crew members on United Airlines . . . constitute one craft or class for purposes of representation and collective bargaining under the Railway Labor Act."

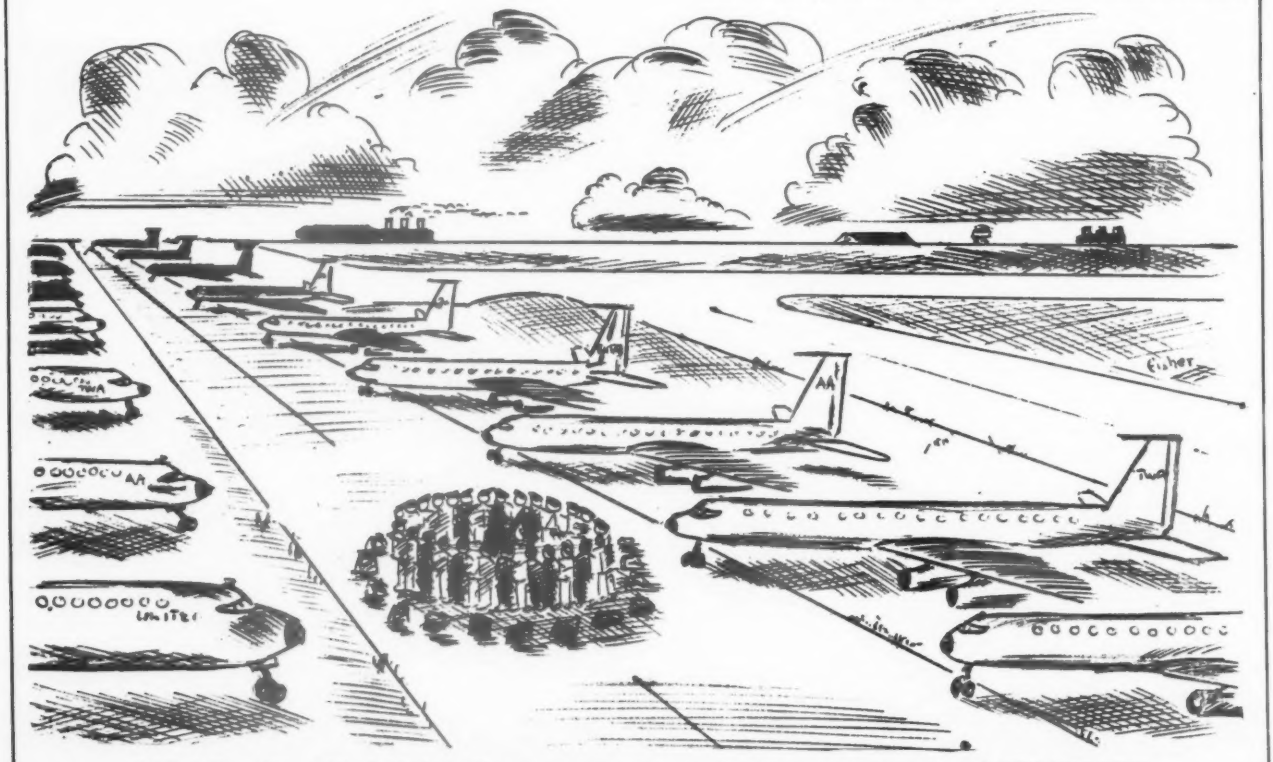
The flight engineers, outnumbered two to one in any election of this sort, took a dim view of this outcome. The wildcat strike, so-called, which began on February 17, 1961, and lasted for six days, effectively grounding the planes of American, Eastern, National, TWA, Pan American, and Western, as well as Flying Tigers, a cargo carrier, was a protest against this determination. Interestingly, United's flight engineers, although immediately involved in the determination, did not strike. The great majority of them had taken flight training and had obtained, or were on the way to obtaining, a commercial license and an instrument rating. While they continued to belong to the F.E.I.A., which still remained their bargaining agent, many also held membership in the pilots' union. But the air lines flying with mechanic engineers were grounded, and it took all of Secretary of Labor Goldberg's very considerable powers of persuasion and a promise from the President of the United States to set up a commission to take another look at the whole problem to get the strikers to return. And even the Secretary of Labor failed to persuade the president of Western Airlines to buy this stopgap solution. He fired his 130 engineers in the midst of the wildcat strike and announced his intention to train pilots as replacements.

The Presidential commission, headed by Professor Nathan Feinsinger of the University of Wisconsin Law School, a skilled mediator and distinguished arbitrator of labor disputes, is now conducting an inquiry and trying to develop a solution. Its recommendations will not be binding. Nor does the commission have the power to set aside the determination in the United case made by the special committee appointed by the National Mediation Board.

What are the prospects for a final solution of this thorny problem? A recommendation by the presidential commission either that the mechanic qualification for flight engineers be retained or that it be discarded in favor of a pilot qualification will not in itself solve the problem. So long as the two organizations, so sharply divided on this question, remain committed to their antithetical philosophies, such a recommendation is likely to continue to fall on deaf ears.

What about the Civil Aeronautics Board? Could it not exercise its rule-making power to establish either a pilot qualification or a mechanic qualifica-

Cartoon Courtesy "Headset", Donald Fisher, Chicago ARTC, Controller



"OK fellas, the altitude today, three one zero, the route sixty victor, questions? SCRAMBLE!"

tion for flight engineers and, by eliminating the possibility of a choice on the part of the carriers, end the pulling and hauling by the two unions? This is theoretically possible, but highly unlikely. Ever since the Civil Aeronautics Board in 1947 ruled that the minimum safety standards it establishes for the industry would be met by having either a pilot-qualified man or a mechanic-qualified man in the third seat, it has found no reason to change its mind. It regards the running battle between pilots and flight engineers as a labor problem, not a safety problem. It is, no doubt, painfully aware that a move by it in either direction would raise a storm on half the nation's airlines.

What about the AFL-CIO? Can it not get its affiliates to merge? President George Meany repeated twice during the recent strike that merger is the only solution to the problem. Two committees of the parent labor organization had previously recommended merger. The A.L.P.A. was willing to talk. The F.E.I.A. leadership, hiding behind a resolution passed by its governing body several years ago forbidding the officers to meet with the pilots on the matter of merger, has so far refused even to consider this solution. The AFL-CIO is a federation of autonomous unions. Its president and executive council can recommend, urge, exhort; they cannot compel an affiliate to take a course of action it does not wish to take. The only possible cudgel, expulsion, is not likely to be effective here.

It is the view of most detached observers that the acceptance of a pilot qualification and merger of the two unions remain the only answer. And although the F.E.I.A. leadership continues to be obdurate, there are indications of a rising awareness among flight engineers that the tide of events is running against them.

What are the underlying factors that make merger a greater possibility now than heretofore?

The first factor is the economics of the industry. When jet airplanes first hit the air travel market in 1959, there was not difficulty in filling their seats. And the jets proved to be more efficient and profitable than expected. As a result, the cost of carrying the fourth man, the carriers' own answer to their immediate dilemma, could easily be absorbed.

But, with the addition of planes to the jet fleet, seat capacity is growing and load factors are declining. Profits from jet operations are becoming slimmer. The cost advantage enjoyed by United and the other carriers who, because they have pilot-trained engineers, carry three crew members, not four, in the cockpits of their jets begins to look extremely important. The result is the likelihood of increased management pressure for a solution based on a pilot qualification for engineers. Evidence of this trend lies in the decision taken by Continental Airlines in 1959 to drop its mechanic qualification for engineers and fly its jets with three men, all pilot-trained. The company won a strike by engineers on that issue. Further evidence lies in the course of action taken by Western Airlines, which several weeks before the recent wildcat strike announced its intention to require all its flight engineers to become pilot-qualified by next July 1 and to train them to that end.

The second factor increasing the chances of acceptance of a pilot qualification for engineers and merger of the two groups is the growing recognition that the basic conclusions reached by the Eastern Airlines Emergency Board in 1958 and by the 1960 committee appointed by the National Mediation Board to make a unit determination on United are valid and proper. Underlying both these findings is recognition of the extra degree of safety inherent in a cockpit crew accustomed by training, inclination, and experience to the utmost of coordination and cooperation. Having the same orientation, such a crew can work together as a unit more effectively than a crew in which there are two separate and distinct specialties. And with three men in the cockpit able to land the aircraft in an emergency caused by the disability of one, an extra margin of safety is present.

Implicit, also, in these reports is the realization that the cockpit is just too small to house men with conflicting ambitions and aspirations who must make an almost conscious effort, once they step into the aircraft, to bottle up the resentments which their bitter dispute has engendered. Men whose work is as highly integrated and coordinated as that of flight engineers and pilots should have identical career aims, aspirations, and ambitions, not highly disparate ones.

The third factor that is edging the problem to a final solution is the growing resentment of public and congressional opinion against the parties to this fight. The public's concern with safety has been heightened by the recent occurrence of a number of air tragedies. Public pressure for higher standards of safety on the airlines is mounting. Any condition in the cockpit tending toward disharmony and conflict, no matter how well sublimated by the sense of professional duty characteristic of both pilots and engineers, raises fears which thrust the problem into the public domain. A public solution may soon be imposed if a private one is not negotiated. And if one is imposed, the history and economics of the problem point toward the adoption of a pilot-engineer requirement.

A merger of the two unions is vital. To be accomplished, merger terms should embody the following ingredients:

First, they should provide present mechanic flight engineers with an opportunity to become pilot-qualified at the expense of the carriers and to progress to copilot and captain in accordance with the normal rules on each carrier. As pilots, these men would have seniority as of the date they fill a copilot vacancy.

Second, they should protect the job security of the present supply of flight engineers by assuring them that so long as flight engineer work remains to be performed on the aircraft, present flight engineer incumbents will have first claim on it, ahead of the present supply of pilots.

Third, present flight engineers unable to qualify as pilots should be permitted to fly as mechanic-qualified engineers until their normal termination by quitting, retirement, or otherwise.

Fourth, merger agreements should be drawn in such a way as to ensure that their terms cannot later be changed by majority vote of the merged group to the detriment of the outnumbered flight engineers.

If the A.L.P.A. is not engaged merely in a job grab—and, F.E.I.A claims to the contrary notwithstanding, there is no evidence that this is its motive—it can clearly assent to merger terms containing these i n g r e d i e n t s. If the F.E.I.A.'s aim is not merely to retain a skill which no longer has a reason for a separate existence, but to protect and enlarge the career opportunities of the present supply of mechanic engineers while enhancing the safety of aircraft operation, it cannot refuse merger terms containing these ingredients without placing 3500 fine men in danger of losing their careers entirely.

If the carriers wish an end to a problem which they had a hand in creating and which has already cost them untold millions, they should be willing to cooperate with the two organizations in effecting such a merger and in shouldering the training costs involved.

With the Flight Attendants

Lake Central organizing committee confers

LAKE CENTRAL AIRLINES' stewardess organizing committee met in the home office July 7, to confer on the pending LCA elections. They met with Carol Carraro, acting treasurer for the S. and S. Division of ALPA. (Left to right) C. Carraro, Marianne Hoyt, Jane Cook, and Judy Pflum.

Why flight attendants Turn to ALPA Division

Why do flight attendants require an organization to represent them as a bargaining agent and why is the Steward and Stewardess Division of ALPA best qualified to be the flight attendants' representative?

The pilots who fly the plane and the flight attendants in the cabin have many things in common. They are employed by the same company, they are on the same aircraft, they have a common interest in raising the standards of their profession, etc.

The progress of civil aviation has been incredibly fast. There are men flying jet air liners today who "pioneered" many of today's routes in open cockpit mail planes. And these pilots will still be alive when the "supersonic" jet planes come into air line operation!

An organization like the Air Line Pilots Association has acquired vast experience in the problems of flight personnel. They have first hand knowledge of these problems and they are actively studying the problems of the future. The introduction of pure jet aircraft is having a great impact on air line operations and is creating new problems for flight personnel. The Association through its many research projects was prepared.

Flight attendants are discovering that working on a pure jet air liner is vastly different from working on smaller, slower, piston-aircraft. These giant aircraft require that flight personnel work harder and faster. Yet compensation and working conditions spelled out in contracts were based on conditions found in piston-aircraft.

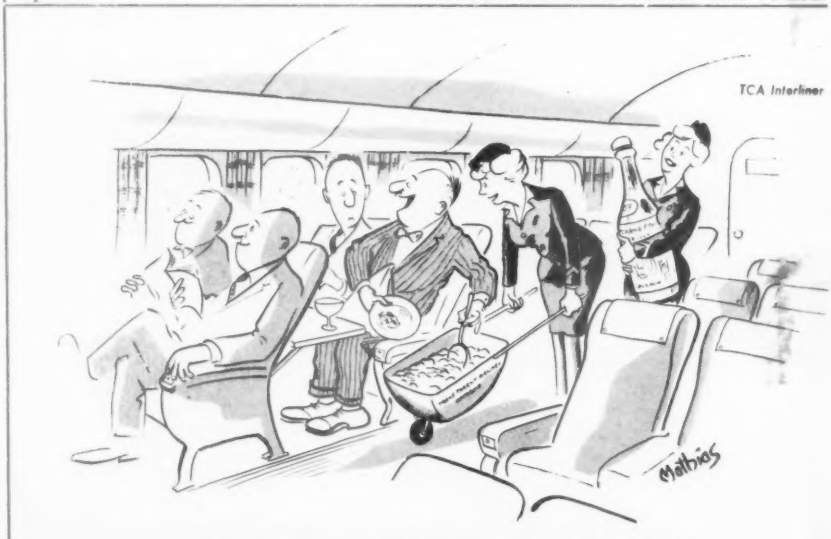
It would be difficult if not impossible for another organization which has nothing in common with flight personnel, except that they are both in the category of transportation, to intelligently represent flight personnel at a management conference table.

Results of a representative election enviable, profession. The affairs of flight attendants must be handled by professional people in the field of aviation. Who could be better qualified than the Steward and Stewardess Division of ALPA?

Frontier flight attendants vote ALPA representation

Flight attendants of Frontier Airlines have voted overwhelmingly for the Steward and Stewardess Division of the Air Line Pilots Association, Int'l (AFL-CIO) to represent them under provisions of the Railway Labor Act.

Results of the election, conducted under the auspices of the National Mediation Board which counted the ballots in Washington, D. C., July 3, showed that of the 74 eligible voters, 52 voted; 41 for ALPA, 11 for the Air Line Stewards and Stewardesses Association and no ballots were voided.



"Like I said, Finchley, nothing fancy on Trans Parent but plenty of it!"

FAA considering measures to crack down on drunks and asks for legislation to cover criminal acts

THIS INCIDENT reported in the Chicago Sun-Times indicates that flight personnel and passengers are exposed to hazards not adequately covered by state or federal law. Historicaally, ALPA has always been against airborne drinking. According to recent press reports, FAA Administrator Halaby is considering a regulation to cope with intoxicated passengers, and he will ask Congress for legislation which would make it a federal crime to commit assault, robbery, maiming and other criminal acts abroad in-flight planes. He also cautioned air lines to keep drunks off their planes.

Turn to Page 4 increase it has been asking.

Janitor Sentenced In Airliner Scuffle

Special to The Sun-Times

LOS ANGELES—The Argo (Ill.) janitor who threatened an airline stewardess with a knife Saturday was sentenced to 90 days in jail Monday for drunkenness and disturbing the peace.

Joseph Newkirk, 60, of 7627 W. 61st, pleaded guilty to the charges before Municipal Court Judge Leo Freund.

A felony complaint of assault with a deadly weapon at first was sought against Newkirk, but that was dropped after it was shown that the knife incident occurred over Nevada, not California.

Stewardess Jane Branning told police that Newkirk became enraged on the United Air Lines Chicago-Los Angeles flight when she took a bottle of whiskey from him.

She said he took out a pocket knife and pushed her before he was subdued by Marine Pvt. Donald Schwalbach, of 887 Deerfield in Highland Park, and the plane's pilot, Edward J. Kelly.

Newkirk told police he remembered nothing of the incident.

U.S. Weather Bureau

FORECAST

To July 15

Temperatures will average about three degrees below normal from July 11 to July 15. Normal high 85, normal low 64. Cooler about Thursday with warming trend by the weekend. Total precipitation about one-fifth inch with showers likely Wednesday or Thursday.

American Airlines photo

Oil was well at Tulsa, Okla., on May 7 when American Airlines inaugurated the first jet service from that city. Tending the pump was LaWanda Bury with the help of an audience which included from left, Glen R. Ames, director of the Gilcrease Institute of American History; U. S. Senator Mike Monroney; C. R. Smith, American's president, and Richard L. Jones, Jr., vice chairman of the Tulsa Aviation Authority. The daily jet service linked Tulsa and nearby Oklahoma City with Dallas and Los Angeles.

Prototype mobile lounge undergoing tests at Washington's Dulles Airport

MOBILE LOUNGE at Washington's Dulles International Airport. This $1,500,000 prototype carries 90 passengers and weighs 38 tons. Because it is impractical to back it up at a busy airport, the lounge has a driver's cockpit at both ends.

U.P.I. Photo

THE ECONOMICS . . .

(Continued from page 3)

ber of units of interest received by the retired pilot is directly related to the number of years of participation in the Plan, the value of the units of interest and the total amount of contributions made by the pilot and the carrier in his behalf. In any given year of participation, a fixed contribution will purchase more or less units of interest as the value of the units is lower or higher. Once the contribution is made, it will increase or decrease in value as a result of yield, appreciation or depreciation of the investment.

In addition, mortality reversions accrue to the pilots who are living along with any reversions as a result of termination of employment by pilots who have not fulfilled a sufficient length of service to secure vested rights to Company contributions or who withdraw their contributions and thus forfeit any rights to Company contributions. These reversions and changes serve to increase the value of, or the number of, the units of interest.

The following table illustrates the fluctuations in such values based on the actual experiences of two different pilot Variable Annuities Plans:

TABLE A

PLAN A

Evaluation Date (December 31st)	Value of Unit of Interest
1955	$10.00
1956	9.831
1957	8.668
1958	12.522
1959	13.274
1960	12.707

PLAN B

Evaluation Date (September 30th)	Value of Unit of Interest
1956	$10.00
1957	10.00
1958	9.2947
1959	10.7806
1960	11.7988
1961	11.6434

Any retired pilot would thus have had his retirement benefits adjusted periodically to reflect the changes in the value of units of interest. The number of units accrued to the pilot at retirement when multiplied by the value of such units, provides the amount due the pilot as a retirement benefit.

An actual experience shown below, effective January 1, 1961, indicates the changes these pilots will experience in their retirement benefits:

TABLE B

Pilot	Monthly Benefit Prior to January 1, 1961	Monthly Benefit to be Paid as of January 1, 1961
A	$ 9.79	$10.07
B	22.96	23.62
C	26.45	27.21
D	30.78	31.66
E	42.71	43.93
F	25.26	25.98
G	46.36	47.68
H	54.10	55.64
I	38.62	39.72
J	37.15	38.21
K	34.30	35.28
L	42.60	43.82
M	63.86	65.68
N	45.76	47.07
O	31.77	32.68
P	49.77	51.19
Q	7.02	7.22
R	49.14	50.54
S	37.69	38.77
T	8.24	8.48
U	6.70	6.89
V	35.54	36.55
W	6.68	6.87
X	55.17	56.75

(Monthly benefits accruing to pilots A to X vary because their lengths of service vary and their earnings are not the same.)

The changes are the result of an increase in the value of a unit of interest from $13.692 to $14.083. Necessarily these pilots who are already retired have minor changes in their benefits. However, in the future, when retired pilots have a larger and larger number of units, the magnitude in the changes which may occur in the benefits could be noticeable in terms of dollars received.

In conclusion, the Association has endeavored to negotiate pilot retirement programs which will hedge the benefits received from extreme fluctuations in the cost of living.

The Fixed Benefits will increase the pilot's purchasing power in the event prices and thus the cost of living decreases. The Variable Benefit will assist in partially insuring the pilot against long term inflation with attendant decreases in purchasing power and increases in the cost of living.

"Project SCAN" . . .

(Continued from page 6)

tinued existence of the mid-air collision problem came into glaring focus with great suddeness. Again, the public knew what the pilots had always known; that near-collisions must be occurring.

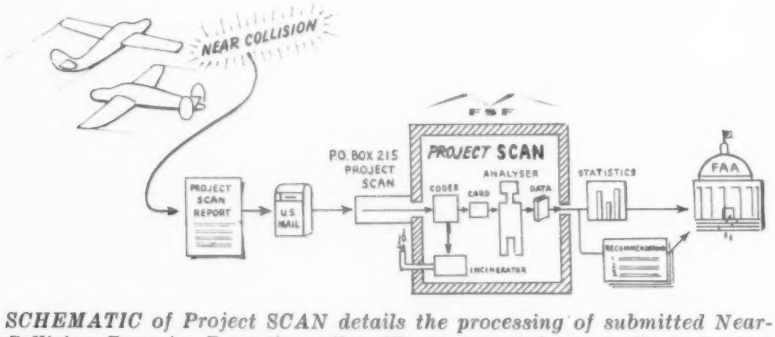
Reporting program to FSF

In the spring of 1961 the new FAA Administrator, Najeeb E. Halaby, instituted a new approach to the program of pilot reports of near-collisions by placing it in the hands of The Flight Safety Foundation, a non-government, independent, non-profit organization, once more assuring reporting pilots of anonymity.

The data obtained from the incident reports will be closely studied and carefully analyzed, and from this detailed analysis conclusions and recommendations will be submitted to the FAA for guidance in bringing about improvements in the specific areas designated by the pattern of reports. This, in essence, is how Project SCAN differs from prior programs.

Prior to Flight Safety Foundation's entry into the near-collision reporting program, all such programs have dealt solely with numbers, emphasis being placed on the magnitude of the problem rather than on possible areas of solution. Flight Safety Foundation's approach embodies incident - report analysis in depth so that corrective action can be taken either immediately or long-range, whichever need is dictated by the patterns of incidents.

Of major importance to reporting pilots is the fact that Project SCAN near-collision reports need not be signed. The report-forms themselves are to be destroyed as soon as the necessary data has been extracted, thus assuring anonymity of the individuals making the reports. According to written agreement, the information contained in these near-collision reports will not be disclosed to the FAA except in statistical form.



SCHEMATIC of Project SCAN details the processing of submitted Near-Collision Reports. Reporting pilot fills in report form, mails it Project SCAN office via Box 215 where report is coded and then destroyed. Coded information is then analyzed, converted to data, and statistics are forwarded to FAA. Meantime where analyzed information suggests specific recommendations, these also are drawn up and forwarded to the Federal Aviation Agency. Pilot making report remains completely unidentified.

The Royal Canadian . . .

(Continued from page 4)

Japan, Australia, India, Europe and so on.

Some of our Montreal based pilots have their families taking the course with them.

Gentlemen, let's look at it this way. As air line pilots we have good jobs. The relationship between our jobs and our health is obvious—at times ominous. When you consider this fact and add to it all the physiological potential offered by 5BX, then it is difficult to understand why anyone would pass this course up. We all spend approximately 10 minutes per day scraping our faces with some form of shaving device so as to conform with standards of appearance—surely we can find 11 minutes per day to invest in our own health. How about giving 5BX a try?

The exercises are shown on the following pages. This is what you do.

1. You make up your mind you want to be a lean, fit airman, just like in the ads.

2. You find yourself eleven minutes every day, your choice—before breakfast, late morning or afternoon or before bed.

3. You do these exercises in ordinary clothing, but light garb, pajamas or shorts, are preferable.

4. Use a watch and do each set of physical jerks within the alloted time and the whole series within the eleven minute period. (Your time may be poor the first few days but try to meet deadlines as soon as possible).

5. On each chart there is a timing table which tells you how much time to spend on each exercise and how many of each to do. EVERYONE starts at the bottom of this table and on chart one — however sharp they think they are. At the D-level of chart one you will see that exercise 1 must be done twice in two minutes; exercise 2 three times in a minute; exercise 3 four times in a minute; exercise 5 100 times in six minutes.

6. On chart two, a one mile run or a two mile walk can be substituted for exercise 5.

7. You progress through each chart from D— to D and on up to A+ at a rate which depends on your age.

If under 20 you spend one day at each level.
under 30 two days at each level
under 40 four days at each level
under 50 seven days at each level
under 60 eight days at each level
over 60 ten days at each level.

8. Everyone does not do all of the charts, it depends on your age. There are maintenance levels for every age group beyond which you do not go. Thus:

If over 60 your maintenance level is A+ on chart one.
From 50 to 60 it is C+ on chart two
From 45 to 50 it is A+ on chart two
From 40 to 45 it is C on chart three
From 35 to 40 it is B on chart three
From 30 to 35 it is C— on chart four
From 25 to 30 it is A+ on chart four

9. When you have reached your maintenance level you will be able to retain physical fitness with eleven minutes of exercise taken three times weekly.

That's all there is, except, of course, getting down to doing it. But if one does, and takes the exercises seriously, they will make him fit. They are so designed that they exercise every muscle in the body the right number of times.

You should not become stiff doing the 5BX exercises. If you do slow down your rate of progress. But you should become a little breathless doing them—they are designed to heat you up a bit.

The greatest mistake people make in taking this course is skipping ahead in the series. This not only defeats the purpose of the exercise, but risks imposing too great a strain on the heart. Don't skip ahead of the stipulated rate.

The Royal Canadian Air Force 5BX Plan is copyrighted in the United States and the British Commonwealth in the name of the Government of Canada. The plan or parts thereof may not be reproduced in any form without permission.

The 5BX Plan is designed for men and boys in normal good health. Should you have any doubt as to your capability to undertake this or any other exercise program, you should consult your medical adviser.

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- **If you have been employed more than 2 years, you may join by taking our physical examination from your company medical department or FAA examiner. If you use your FAA Doctor we suggest you apply before your next regular physical. We will pay the difference in cost between the class 1 and our more thorough examination.**
- **If employed over 2 years maximum age is 35.**

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- Trans Caribbean
- Trans - Texas
- Trans World
- West Coast
- Western